

N92-14519 J

- A. TITLE OF RESEARCH TASK: Airborne Aerosol Lidar (RTOP 147-14-34-79)
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- C. ABSTRACT. The objectives of this research are: (1) to analyze dual-polarization lidar measurements of aerosols and polar stratospheric clouds (PSCs) obtained aboard the NASA Ames DC-8 aircraft during the 1989 Airborne Arctic Stratospheric Expedition (AASE); and (2) to combine lidar, SAM II, and other AASE data with theoretical modeling calculations to investigate PSC characteristics.
- D. SUMMARY OF PROGRESS AND RESULTS. The Langley dual-polarization aerosol lidar system was successfully integrated aboard the Ames DC-8, and measurements of stratospheric aerosols and PSCs were obtained on all AASE flights (14 Arctic missions and 2 ferry flights). In addition, aerosol and PSC measurements made during AASE by the satellite-borne SAM II sensor were transmitted daily (in both graphical and digital form) to the experiment site in Stavanger, Norway, to assist in mission planning. Final analysis and archival of the AASE SAM II data were completed in April 1989. Preliminary analysis of lidar data from all AASE Arctic missions has been completed, and follow-on studies of 4 Arctic missions are currently in progress. Comparisons of opportunity have been made between AASE lidar and SAM II measurements to study the spatial and temporal variability of PSC properties. A conceptual model for generic classification of the dual-polarization lidar observations has been developed and is being used with theoretical calculations and available meteorological data to investigate PSC formation and growth mechanisms. PSCs were also observed over Northern Europe (near latitude 50N) from Jan. 31-Feb. 2, 1989, by the spaceborne SAGE II sensor; analysis of these multi-wavelength PSC extinction data is in progress. Manuscripts are in preparation (for the AASE special issue of Geophysical Research Letters) to present the lidar and SAM II observations and their comparisons of opportunity, the conceptual lidar data classification model, and the SAGE II PSC observations.
- E. JOURNAL PUBLICATIONS. None (manuscripts in preparation)